Emulex Driver for FreeBSD User Manual

EMULEX CONFIDENTIAL. Copyright © 2012 Emulex. All rights reserved worldwide. No part of this document may be reproduced by any means or translated to any electronic medium without the prior written consent of Emulex.

Information furnished by Emulex is believed to be accurate and reliable. However, no responsibility is assumed by Emulex for its use; or for any infringements of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent, copyright or related rights of Emulex.

Emulex, the Emulex logo, AutoPilot Installer, AutoPilot Manager, BlockGuard, Connectivity Continuum, Convergenomics, Emulex Connect, Emulex Secure, EZPilot, FibreSpy, HBAnyware, InSpeed, LightPulse, MultiPulse, OneCommand, OneConnect, One Network. One Company., SBOD, SLI, and VEngine are trademarks of Emulex. All other brand or product names referenced herein are trademarks or registered trademarks of their respective companies or organizations.

Emulex provides this manual "as is" without any warranty of any kind, either expressed or implied, including but not limited to the implied warranties of merchantability or fitness for a particular purpose. Emulex may make improvements and changes to the product described in this manual at any time and without any notice. Emulex assumes no responsibility for its use, nor for any infringements of patents or other rights of third parties that may result. Periodic changes are made to information contained herein; although these changes will be incorporated into new editions of this manual, Emulex disclaims any undertaking to give notice of such changes.

Emulex, 3333 Susan Street

Costa Mesa, CA 92626

Supported Driver Versions

The following table lists the Emulex-supported Ethernet drivers that are applicable in this manual.

A checkmark "✓" indicates the type of driver distribution that is supported.

Driver Version	Driver Distribution: Out-of-Box	Operating System Version
Ethernet Drivers		
4.2.313.0	✓	FreeBSD 9.0
4.2.313.0	✓	FreeBSD 8.2
4.2.313.0	✓	FreeBSD 8.1

Table of Contents

Supported Driver Versions 3
List of Tables 5
1. Introduction 6
Overview 6
Supported Versions and Adapters 6
Known Issues 6
2. Installing and Uninstalling 7
General Installation Requirements 7
Installing the FreeBSD Driver Kit 7
Uninstalling the FreeBSD Driver Kit 7
Updating the FreeBSD Driver Kit 8
Loading and Unloading the Driver 8
3. Configuration 9
NIC Driver Configuration 9
Kernel Module Parameters 9
Configuring TSO 9
Configuring LSO 9
Configuring Jumbo Frame Transmit 10
Viewing Device Driver Statistics 10
Updating the Firmware 10
Extracting an SFP Module's VPD Information 11

List of Tables

Table 3-1 Kernel Module Parameters..... 9

1. Introduction

Overview

This document provides installing, uninstalling, updating, and configuring procedures for an Emulex-supported FreeBSD NIC driver release.

Supported Versions and Adapters

This manual is applicable to several versions of FreeBSD NIC drivers, operating systems, firmware, and adapters.

- For a list of supported Emulex drivers for FreeBSD and their associated compatible operations systems, see "Supported Driver Versions" on page 3.
- For supported firmware versions and their latest release, see the "Downloads" page on the Emulex website for the specific adapter.

The FreeBSD operating system supports the Emulex OCe11102 universal converged network adapter (UCNA). The driver and UCNA support:

- PCI-e bus standard
- Statistics – Ethernet statistics provided for the number of packets received and sent, as well as, errors encountered.
- Jumbo Packets – Packets greater than 1500 bytes
- Virtual Local Area Network (VLAN)
- Multicast – Packets sent from a source to a group of destinations.
- RSS – Load balancing on Rx traffic across multiple Rx queues.
- TSO/LSO (TCP Segmentation Offload/Large Segment Offload) – off loads Tx traffic to hardware to improve performance.
- CSO – Check-sum computation offload to hardware.
- Bonding – Ethernet bonding across multiple ports for load balancing and fail-over.
- PXE – Preboot eXecution Environment for network boot
- MSI-x – Message Signal Interrupts
- Promiscuous mode – Configuring an Ethernet interface to accept traffic from any destination.
- Debugging capability

Known Issues

Known issues are defined in the *Emulex Drivers for FreeBSD Release Notes*, which are available on the driver's "Downloads" page on the Emulex website.

2. Installing and Uninstalling

General Installation Requirements

Prior to driver installation, follow these requirements:

- Install a supported Emulex OneConnect UCNA adapter in the system. Refer to the adapter's installation manual for specific hardware installation instructions.
- Install the FreeBSD NIC driver on a dual-core (or better) server with AMD-64 architecture and MSI-X support.
- Use a supported operating system. See “Supported Driver Versions” on page 3 for a complete list.

Installing the FreeBSD Driver Kit

To install the FreeBSD driver kit:

1. Download the appropriate driver kit from the Emulex website.
2. Log on as “root” and type

   ```
   pkg_add oce-<VERSION>-<ARCH>.tbz
   ```

   For example:

   ```
   pkg_add oce-4.1.86.0-amd64.tbz
   ```
3. Type

   ```
   echo 'oce_load="YES"' >> /boot/loader.conf
   ```
4. Reboot the system.

Uninstalling the FreeBSD Driver Kit

To uninstall the FreeBSD driver kit:

1. Log on as “root”.
2. Type

   ```
   pkg_delete oce-<VERSION>-<ARCH>
   ```

   For example:

   ```
   pkg_delete oce-4.1.86.0-amd64
   ```
3. Remove the `'oce_load="YES"'` entry from the /boot/loader.conf file.
4. Reboot the system.

Updating the FreeBSD Driver Kit

To update the FreeBSD driver:

1. Type

   ```
   pkg_update oce-<VERSION>-<ARCH>.tbz
   ```

   For example:

   pkg_update oce-4.1.86.0-amd64.tbz

2. Reboot the system.

Loading and Unloading the Driver

To load the kernel module, type

```
kldload oce.ko
```

To unload the kernel module, type

```
kldunload oce.ko
```

To verify that the driver loaded properly, type

```
kldstat | grep oce
```

3. Configuration

NIC Driver Configuration

Kernel Module Parameters

Table 3-1 Kernel Module Parameters

Parameter	Description
max_rsp_handled	Default:512 Allowed values: 1–1024 kenv name: hw.oce.max_rsp_handled sysctl name: dev.oceX.max_rsp_handled max_rsp_handled indicates the maximum number of received frames that are processed during a single receive frame interrupt.

Configuring TSO

TSO can be configured globally (affects all controllers in the system) or individually for Emulex adapters.

To enable TSO globally, type

```
sysctl net.inet.tcp.tso=1
```

To disable TSO globally, type

```
sysctl net.inet.tcp.tso=0
```

To enable TSO only for NIC interfaces, type

```
ifconfig oceX tso
```

To disable TSO only for NIC interfaces, type

```
ifconfig oceX -tso
```

Configuring LSO

To enable LSO, type

```
ifconfig oceX lso
```

To disable LSO, type

```
ifconfig oceX -lso
```

Configuring Jumbo Frame Transmit

To enable Jumbo frames transmission, type

```
ifconfig oceX mtu <mtu>
```

where `mtu` should be less than or equal to 9000.

Viewing Device Driver Statistics

To view device driver statistics, type

```
sysctl -a | grep oce
```

Updating the Firmware

To update the firmware:

1. Copy the code below to the makefile.

   ```
   .KMOD=elxflash
   FIRMWS=imagename.ufi:elxflash
   .include <bsd.kmod.mk>
   ```

2. Replace "imagename" in the copied code with the actual firmware file name. The format is <filename>.ufi.
3. Copy this makefile and the firmware file to a temporary directory.
4. Run a "make" command in the directory. This generates an elxflash.ko file.
5. Copy the elxflash.ko file to /lib/modules.
6. Run the command:

   ```
   sysctl dev.oce.<if_id>.fw_upgrade=elxflash
   ```

   Note: `if_id` can be any of the interface values that correspond to the Emulex interfaces in the ifconfig output.

7. Check if the sysctl command execution for the firmware update was successful.

   If it was successful, reboot the system. Otherwise, you should see one of the following errors codes:

   - Invalid BE3 firmware image
   - Invalid Cookie. Firmware image corrupted?
   - cmd to write to flash rom failed.

Extracting an SFP Module's VPD Information

To dump an SFP module's vital product data (VPD):

1. Trigger the dump by typing

   ```
   sysctl dev.oce.<if_id>.sfp_vpd_dump=0
   ```

2. Choose one of the following dump options:
   - For a hexadecimal dump, type

     ```
     sysctl -x dev.oce.<if_id>.sfp_vpd_dump_buffer
     ```

   - For a binary dump, type

     ```
     sysctl -b dev.oce.<if_id>.sfp_vpd_dump_buffer > <filename>
     ```

     where `filename` is the file into which the output should be redirected.
     For example:

     ```
     sysctl -b dev.oce.<if_id>.sfp_vpd_dump_buffer > sfp.bin
     ```